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missing link between these two hitherto entirely different types of peroxids, its active oxygen being at the same time both entirely ozonic and entirely antiozononic." He believes both praseodymium and neodymium may be further split up and will give when pure for their highest oxids the formulæ Pr_2O_5 and Nd_2O_6 ; hence, he would arrange the eighth series of the periodic system as follows:

I.	II.	III.	IV.	V.	VI.
Cs	Ba	La	Ce	Pr	Nd
133	137.4	138.2	139.7	141	143.6

SOME months ago a petition, signed by several hundred members of the Chemical Society (London), was presented to the Council, asking for an amendment to the By-Laws so that members could vote for the officers at the annual meeting by proxy or by mail. As the number of members who can be present at this meeting is not large, a comparatively small proportion of the total membership practically controls the offices. The Council declined to take any action owing to the fact that such a By-Law would conflict with the charter. An effort was then made to have the Council seek an amendment to the charter, which was declined. A petition was then presented to have the Council take action to obtain the views of the members by taking a mail vote on the question: "Are you in favor of the proposal that a supplemental charter should be applied for to the Privy Council so as to enable Fellows to vote at the annual election of the officers by post or proxy?" This also the Council declines to do. The desire of the petitioners is so manifestly just that it is hardly probable the matter will be allowed to rest at this point, but it is to be greatly hoped that the usefulness of the Society will not be impaired by dissensions.

J. L. H.

SCIENTIFIC NOTES AND NEWS.

THE CHICAGO SECTION OF THE AMERICAN MATHEMATICAL SOCIETY.

THE third regular semi-annual meeting of the Chicago Section of the American Mathematical Society was held at the University of Chicago, on Saturday, April 9, 1898, with the following program:

1. A triangle related to Nagel's triangle. PROFESSOR ROBERT J. ALEY, Indiana University.

2. The ellipsograph of Proclus and its inverse (illustrated by models). DR. E. M. BLAKE, Purdue University.

3. The structure of the hypo-abelian groups. DR. L. E. DICKSON, University of California.

4. I. Quaternion notes. II. Introduction to the theory of functions of a quaternion or a vector variable. DR. SHUNKICHI KIMURA, Sendai, Japan.

5. On the most general form of the inner potential consistent with the complete integration of the differential equations of motion of a free system of two bodies. DR. KURT LAVES, the University of Chicago.

6. Concerning the case where a linear substitution group of finite order in n variables breaks up into groups in a lower number of variables. ASSOCIATE PROFESSOR H. MASCHKE, the University of Chicago.

7. On the roots of a determinantal equation. PROFESSOR W. H. METZLER, Syracuse University.

8. A two-parameter class of solvable quintics in which the rational relations amongst the roots by threes are independent of the parameters (preliminary communication). HEAD PROFESSOR E. H. MOORE, the University of Chicago.

9. Dual algebras. PROFESSOR JAMES BYRNIE SHAW, Illinois College.

At the opening of the afternoon session, in response to the invitation of the program committee, Professor Michelson, of the University of Chicago, made a very interesting exhibition of the theory and of the workings of the new 'Harmonic Analyser' to the members of the Society.

PROPERTIES OF THE X-RAYS.

PROFESSOR RÖNTGEN has made to the Berlin Academy of Sciences a third communication on the X-rays. A summary in the *Electrical World* states that if an opaque plate is placed between the tubes and the screen, covering the whole of the latter, some fluorescence will still be seen even when the plate is directly on the screen;

he showed that this is due to the fact that the air around the tube gives forth X-rays; if our eyes were sensitive to these rays, as they are to light, then such a tube would be like a light in a room filled with smoke. The brightness of a screen illuminated with rapidly intermittent rays depends on a number of properties which he enumerates. The X-rays from a platinum focus plate which are most active for showing images are those which leave the plate at the greatest angle, but not much greater than 80° ; thick plates have a relatively larger transparency than thin ones, that is, the specific transparency of a body is greater the thicker the body; when two plates of different bodies are equally transparent they need not necessarily be so when similarly increased in thickness; the relative thickness of two equally transparent plates of different materials is dependent on the material and its thickness, through which the rays have passed before they reach those plates; the same body has different transparencies with different tubes, 'soft tubes' being those requiring a small potential and 'hard tubes' those requiring a high one; he states that all bodies are more transparent for rays from hard tubes than from soft ones, and in obtaining images this must therefore be considered; the quality of the rays from the same tube depends on: The way in which the interrupter works; the Deprez form acts more regularly, while the Foucault form utilizes the primary current better; on the spark length in series with the tube; on the insertion of a Tesla transformer; on the vacuum; on other processes in the tube which are not yet fully investigated. A spark gap in series acts like a Tesla transformer, both giving more intense rays which are less easily absorbed; the smallest pressure at which X-rays are produced is very likely below 0.0002 mm. of mercury. The hardening of a tube is not produced only by continuing the exhaustion; to soften a hard tube, air may be admitted; it may be warmed, or the current reversed, or very strong discharges sent through it, but the latter generally changes the character of the tube; good results were produced with a tube containing a piece of charcoal of linden wood. The composition of the rays from a platinum anode depends

largely on the element in the current; the quality of the rays does not change with changes of the primary current, or at least very little, but the intensity is proportional to the strength of the primary current between certain limits. He draws the following conclusions: The radiation consists of a mixture of rays of different intensity and absorbability; the composition depends greatly on the time element in the current; the rays produced by the absorption of bodies are different for different bodies; as X-rays are produced by cathode rays, and as both have common properties, it is probable that both processes are of the same nature. If two screens are illuminated with two tubes of different hardness, the illumination being made equal, and if then replaced by photographic plates, the one illuminated by the harder tube will be blackened much less than the other; rays which produce equal fluorescence can be photographically quite different; the usual photographic plates are very transparent for X-rays; in a pile of ninety-six filaments exposed for five minutes the last one showed photographic action. That the eye is not entirely passive to X-rays is shown by an experiment; in looking at a slit in a metal screen with the closed eye covered with a black cloth and by moving the head, a very weakly illuminated slit will be noticed; this may be explained by assuming that fluorescence is produced on the retina.

'CHRISTIAN SCIENCE.'

PROFESSOR J. MARK BALDWIN has, in the press of the Appletons, a little book called 'The Story of the Mind' (Useful Story Series). He allows us to print, from the proofs, the following short passage, which may have some interest to our readers in view of certain recent discussions by committees of the Massachusetts and New York Legislatures:

"All mental diseases involve disease of the brain, and can be cured only as the brain is cured. It does not follow, of course, that in some cases treatment by mental agencies, such as suggestion, the arousing of expectation, faith, etc., may not be more helpful here than in troubles which do not involve the mind, provided these agencies be wisely employed; but yet the

end to be attained is a physical as well as a mental cure, and the means, in the present state of knowledge, at any rate, are mainly physical means. The psychologist knows practically nothing about the laws which govern the influence of mind on body. The principle of suggestion is so obscure in its concrete working that the most practiced and best-informed operators find it impossible to control its use or to predict its results. To give countenance, in this state of things, to any pretended system or practice of mind-cure, Christian science, spiritual healing, etc., which leads to the neglect of ordinary medical treatment, is to discredit the legitimate practice of medicine and to let loose an enemy dangerous to the public health.

"Moreover, such things produce a form of hysterical subjectivism which destroys sound judgment and dissolves the sense of reality which it has taken modern science many generations to build up. Science has all along had to combat such wresting of its more obscure and unexplained facts into alliance with the ends of practical quackery, fraud and superstition; and psychologists need just now to be especially alive to their duty of combating the forms of this alliance which arise when the new results of psychology are so used, whether it be to supplement the inadequate evidence of 'thought transference,' to support the claims of spiritualism, or to justify, in the name of 'personal liberty,' the substitution of a 'healer' for the trained physician. The parent who allows his child to die under the care of a 'Christian science healer,' is as much a criminal from neglect as the one who, going but of step further in precisely the same direction, brings his child to starvation on a diet of faith. In France and Russia experimenting in hypnotism on well persons has been restricted by law to licensed experts; what, compared with that, shall we think of this wholly amateurish experimenting with the diseased? Let the 'healer' heal all he can, but don't let him experiment, to the extremity of life and death, with the credulity and superstition of the people who think one 'doctor' is as good as another."

GENERAL.

At a stated meeting of the Board of Overseers of Harvard College on April 13th it was

voted to concur with the President and Fellows in their votes appointing Alexander Agassiz, LL.D., Director of the Museum of Comparative Zoology, as professor emeritus.

MAJOR JIRARD and Medical Director Tryon have been in attendance at the Congress of Hygiene, Madrid, as delegates from the medical departments of the army and navy of the United States.

THE Council of the Linnæan Society, London, has decided to award the Society's gold medal this year to G. C. Wollich, in recognition of his investigation of the biological conditions of the deep sea.

WE regret to record the death, on April 17th, of Dr. Jules Marcou, the geologist and a writer on a wide range of scientific subjects. Dr. Marcou was born in Salins, France, seventy-five years ago.

SIR WILLIAM TURNER, F. R. S., professor of anatomy at Edinburgh, has been elected a corresponding member of the Berlin Academy of Sciences.

SIR SAMUEL WILKES has been re-elected President of the Royal College of Physicians, London.

THE French Minister of Public Instruction has announced that the prize of the value of \$1,000, founded by M. Angrand for a work on American archæology, has been awarded to Dr. Hamy for a study of The Gallery of American Antiquities in the Museum of Trocadéro.

THE Municipal Council of Paris has authorized the erection of the monument to Charcot by Falguière on the Place de l'hospice de la Salpêtrière.

M. FELIX FAURE, President of the French Republic, has consented to preside at the first session of the International Medical Congress to be held in Paris in 1900.

PROFESSOR FREDERICK STARR, of the University of Chicago, has lately returned from a trip to Mexico, in which he began a study of the physical types of the southern Mexicans. Four tribes were visited—Otomi, Tarascan, Tlaxcalan, Aztec. Careful descriptive notes, measurements and photographs were made. One hundred men and twenty-five women, in each tribe, were examined. A series of fourteen

plaster busts was made. Collections of dress, implements and weapons were secured. The work will be continued next winter among the tribes of Oaxaca and Chiapas, the southernmost States of the Republic. The results so far gained will probably be presented at the next meeting of the A. A. A. S. A somewhat careful examination was also made of the ruins of La Quemada, in the State of Zacatecas. The curious and ancient picture record of the Conquest preserved at Cuabhlautzineo was photographed and will soon be published. A large collection of objects illustrating the folk-lore of the half-breed Mexicans was secured; this is to belong to the English Folk-Lore Society. The catalogue of this collection, with descriptive notes, is to be printed as one of the Society's regular publications. Lastly, some investigation was made of hexdactyly and other abnormal conditions, some interesting molds and data being gathered.

PROFESSOR LAWRENCE BRUNER, of the University of Nebraska, returned, on April 6th, from the Argentine Republic, where he had been engaged for year in studying the habits of a devastating locust. His report is now in press and is expected to appear soon.

THE Royal Society will hold its first Convezazione this year on Wednesday, May 11th.

A 'JARDIN DE KEW' is to be established in the neighborhood of Nantes by a rich citizen of that town. The new botanical garden will be planned on the same lines as the Royal Gardens at Kew, and special attention will be given to the cultivation of plants useful in French colonies. It is hoped that the garden will eventually do for French colonial possessions what Kew does for British colonies.

A COURSE of ten popular lectures on Amphibians and Reptiles will be delivered in the lecture room in the Zoological Society of London Gardens, Regent's Park, on Thursdays, at 5 p. m., commencing April 21st, by Mr. F. E. Beddard, M.A., F.R.S., Prosector to the Society.

A SECTION of ornithology has been formed in the California Academy of Sciences, with Mr. L. M. Loomis as President.

THE late Mr. G. C. Dennis has bequeathed

his entomological collection to the Yorkshire Philosophical Society.

THE United States Civil Service Commission calls attention to the examination which will be held on May 6, 1898, at any place where the Commission has a competent board of examiners, for establishing a register from which the position of Chief of Division of Library and Archives, United States Coast and Geodetic Survey, Treasury Department, at a salary of \$1,800 per annum, may be filled. This is a very important and responsible position, and the Commission is anxious that the competition shall be as extensive as possible. On April 25th an examination will be held for a teacher of manual training in the Indian service, with a salary of \$720.

THE executors of the late Baron Ferdinand von Müller, Government Botanist of Victoria, are collecting money to erect a monument over his grave in the St. Kildare Cemetery at Melbourne. Over one hundred subscriptions have already been received, including donations from the London Royal Geographical Society and other scientific associations. We do not notice in the list any subscriptions from America, and it is to be hoped that these will be supplied before the subscription is closed. Letters should be addressed to Rev. W. Potter, 'Vonmueller,' Arnold street, South Yarra, Melbourne, Australia.

WE are also informed that Baron von Müller's supplemental volume on the *Flora Australiensis*, upon which he had worked for years and was preparing for the press at the time of his death, together with two volumes on his administration as Director of the Botanical Gardens, embracing a biography and complete bibliography of his writings, are to be published. His executors will feel favored by the loan of any of his letters, or the communication of incidents in the Baron's life which his friends deem to be worthy of notice in his biography. Communications on this subject should also be addressed to the Rev. W. Potter.

To commemorate the dedication of the new laboratory of chemistry of the University at Leipzig, its Director, Professor Ostwald, has collected the researches carried out in the old

laboratory by him and his students during the ten years from 1886 to 1896. The four large volumes resulting are published by Herr Engelmann, Leipzig.

THE long-looked-for first volume of the 'Phytogeography of Nebraska,' by Messrs. Pound and Clements, was received from the printer by the authorities of the University of Nebraska on the 7th of the current month.

THE April number of *The Auk* contains the programs of the annual meetings of the Delaware Valley Ornithological Club and of the United Ornithologists of Maine. The former Club met at the Academy of Natural Sciences in Philadelphia, with 34 members in attendance. Mr. I. Norris DeHaven and Mr. Charles J. Rhodes, Secretary. The United Ornithologists of Maine held their second annual meeting in the rooms of the Portland Society of Natural History on December 31st and January 1st. Mr. Ora W. Knight was elected President and Mr. L. W. Robbins Secretary. The *Maine Sportsman* is the official organ of the Society and publishes full accounts of the meetings and many of the papers.

THE following bill, introduced by Senator George F. Hoar, has already passed the United States Senate, though it is rumored that certain importers and milliners have held a meeting in New York, and propose to send a powerful lobby to Washington to defeat the bill in the House. There is, however, some probability that the bill will pass the House if humane persons and those interested in the protection of our native animals will immediately call the matter to the attention of their Representatives.

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the importation into the United States of birds, feathers, or parts of birds for ornamental purposes, be, and the same is hereby prohibited; Provided, however, That nothing herein contained shall be construed as prohibiting the importation of birds for museums, zoological gardens, or scientific collections, or the importation of living birds or of feathers taken from living birds without injury to the bird. The Secretary of the Treasury is hereby authorized to make regulations for carrying into effect the provisions of this section.

"Sec. 2. That the transportation of birds, feathers, or parts of birds, to be used or sold, from any State or Territory of the United States to or through any other State or Territory of the United States, is hereby prohibited. Whoever shall violate the provisions of this section shall, upon conviction in the district where the offense shall have been committed, be punished for each such offense by a fine of fifty dollars.

"Sec. 3. That the sale, keeping, or offering for sale, within any Territory of the United States, or within the District of Columbia, of birds, feathers, or parts of birds, for ornamental purposes, except such as are excepted in the first section of the Act, be, and the same is hereby prohibited. Whoever shall violate the provisions of this section shall, upon conviction, be punished for each such offense by a fine of fifty dollars."

THE Massachusetts Audubon Society held a meeting in Association Hall, Boston, on April 14th, to protest against the slaughter of birds for millinery purposes. Professor C. S. Mirot presided and made an address, which was followed by addresses by Mrs. Alice Freeman Palmer and by Mr. Frank M. Chapman, of the American Museum of Natural History, New York.

ARRANGEMENTS for the excursions of the Appalachian Mountain Club of Boston for the present year are not yet completed, but there is a strong probability that the following program will be carried out: May 27th-June 1st, Hoosac Tunnel Station. The intention is to visit Greylock, and Haystack in Wilmington, Vt. June 16th-19th, Warwick and Mt. Grace. June 17th, harbor excursion. July 1st-11th, the Field Meeting will, in all probability, be held in the Adirondacks. August, there will be a camping party at a lake. September 2d-6th, Camden, Me., and its mountains will be visited. October, Dixville Notch (a week or ten days).

CAPTAIN JACQUES read, on March 31st, an interesting paper before the British Institution of Naval Architects on 'Submarine Torpedo Boats,' in which he criticised the contemporary form of torpedo boat, asserting its unreliability and general flimsiness, and gave as his opinion that it is often more dangerous to its own crew than to the enemy. He considers the submarine torpedo boat the coming

form of this most modern of naval weapons and points to its complete invisibility in action, its power of carrying armor if desired, its perfect liberty of movement under water and safety and certainty in placing its torpedo, as well as the comfort and safety of its own crew, as considerations that must inevitably ultimately give it the leading place in a naval establishment, and especially for one like that of the United States, planned mainly for defense.

THE commercial reporters of *Industries and Iron* state that Messrs. L. Lowe & Co., of Berlin, Germany, manufacturers of electric supplies, have ordered from the United States an Allis-engine of 900 h. p. to furnish light and power at their works. The Société des Railways économiques de Liège, Seraing et Extensions, and the Compagnie générale des Railways à Voie étroite, have sent to the United States for a complete electrical equipment of the Westinghouse Company's make. A large business has been secured by builders of heavy machinery in the United States, for delivery in Great Britain, and it now seems probable that they may find a profitable and an extensive market on the Continent of Europe. The manufacturers of Europe are, however, reported to have good business, and competition from this side of the ocean has not produced any sensible effect in the direction of transfer of trade to this country.

It will be remembered that the Paris International Meteorological Conference of 1896 appointed a permanent Committee on Terrestrial Magnetism and Atmospheric Electricity, and submitted to it a number of questions for report. In order that these questions may be well discussed, says *Nature*, it has been decided to hold an international conference on terrestrial magnetism and atmospheric electricity in connection with the forthcoming meeting of the British Association at Bristol, which will begin on September 7th. Letters of invitation are being sent out by the Committee; and all foreigners who propose to attend the conference may obtain tickets of membership of the British Association, free of charge, on application to the Assistant General Secretary of the Association. Among the subjects to be discussed are: The calculation of monthly means with and without taking dis-

turbed days into account; the publication of the monthly means of the components X, Y, Z, and the differences ΔX , ΔY , ΔZ , of the monthly means from the preceding means; the establishment of temporary observatories, especially in tropical countries; and the relative advantages of long and short magnets. The decisions of the conference upon these questions will be reported direct to the International Meteorological Conference. But though the first business of the conference will be to report upon the questions submitted to them, papers and communications on other subjects connected with terrestrial magnetism and atmospheric electricity are also invited. It is desired that such papers be sent to the Committee some time before the opening of the British Association meeting.

UNIVERSITY AND EDUCATIONAL NEWS.

At a meeting of the Board of Trustees of Cornell University on April 14th it was decided to establish a medical department to be located in New York City. The faculty will consist chiefly of the members of the faculty of the New York University Medical College who have been dissatisfied with the relations between the College and the University. The new medical college, like other departments of Cornell University, will be open to women on the same terms as to men, and students appointed to State scholarships by the Superintendent of Public Instruction may obtain free tuition from Cornell University in medicine hereafter, as they now obtain it in art, law, engineering, architecture, etc. It appears that Colonel Oliver H. Payne has given \$500,000 toward an endowment and that buildings will be erected at once. The College will be opened next year with Dr. W. M. Polk as Director.

At the same meeting Dr. B. E. Fernow, Chief of the Division of Forestry, United States Department of Agriculture, was elected Director of the College of Forestry, recently established by an appropriation from the Legislature of the State of New York.

PROFESSOR EARL BARNES, lately professor of education in Stanford University, will, it is